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Determinants of Antenatal Care Utilization in Ambo Town, Central Ethiopia: Community Based Cross Sectional Study

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Abstract
Antenatal care utilization is an important determinant of high maternal mortality rate and one of the basic components of maternal care on which the life of mothers and babies depend.Thus, the purpose of this study was to understand the current status of utilization of antenatal care services in the study area by elucidating the various factors influencing it.A cross-sectional community based household survey was carried to assess factors determining utilization of antenatal care services. The study was conducted between February and March 2014. Structured questionnaire was used for data collection. Bivariate and multivariate logistic regression analyses were conducted at significance level of $p< 0.05$. A total of 410 study subjects attended the interview making a response rate of 97.2 %.Around 42.8 % of the women had attended ANC less than four times; and the median frequency of visits was three. In the final multivariate model, educational status, marital status, access to media and income were found to be significant factors affecting the utilization of antenatal care. In conclusion, this study identified that WHO recommended ANC visit coverage is low.Women empowerment through education and income generating activities as well as partner involvement are recommended.
Keywords: ANC, maternal morbidity, maternal mortality, Ambo

Introduction

Globally, a woman dies every minute from complications related to childbirth. About 287, 000 women die each year due to maternal causes with 99% of the deaths taking place in developing countries[1-3]. The child bearing functions of women, especially in developing countries, have been granted as a normal or routine process. Yet these valued and precious parts of life are among the most hazardous experiences that women often engage in without being aware of the risks or dangers that they are in[1]. Antenatal care utilizationis an important determinant of high maternal mortality rate and one of the basic components of maternal care on which the life of mothers and babies depend[4]. It is essential for diagnosing and treating complications that could endanger the lives of mother and child. It offers pregnant women an opportunity to get different services which alert the woman to the risks associated with pregnancy and for discussing her options for safe delivery[5, 6.The] main objectives of antenatal care are to deliver effective and appropriate screening, preventive and treatment interventions. Effective use of antenatal care contributes to better maternal health outcomes and safer birth. Mothers who attend antenatal care optimally are more likely to seek skilled care at birth. Antenatal care is an opportunity for assisting the women to make birth and emergency preparedness plan[7-9].According to a new WHO model four ANC visits with the first visit within the first trimester has recently been recommended for women with uncomplicated pregnancy[10].Over 70% of women worldwide have at least one ANC visit during pregnancy. However, in most African countries, less than 70% of pregnant women receive ANC where most of them have only one or two visits. Among those who utilize the services some receive the service only late in pregnancy[6,11].

Studies conducted in developing countries show that maternal age, number of living children, education, place of residence, occupation, religion and ethnicity are significantly associated with antenatal care utilization[12, 14].

In Ethiopia, maternal mortality and morbidity levels are among the highest in the world[17]. According to 2011 Ethiopian demographic and health survey (EDHS) maternal mortality ratio was 676 per 100,000 live births[17]. In Ethiopia, poor health outcome among women is associated with low utilization of modern health care services including ANCby a great proportion of women.[15,16]. As indicated in 2011 EDHS report, the coverage of antenatal care was 34%. Even among those who use ANC, lower proportions of women receive care according to WHO recommendations (beginning ANC in the first trimester, and making four antenatal care visits. For instance, from 2011 EDHS report, only 19% of women who attended ANC had four or more ANC visits. Nearly one in ten users (11%) made their first ANC visit before the fourth month of pregnancy [17].

In spite of the national and global efforts at reducing maternal morbidity and mortality through the safe motherhood initiative including ANC and skilled delivery service utilization, there is no significant reduction in maternal mortality in Ethiopia. There could be several factors that limit ANC care utilization in Ethiopia in general, the study area in particular which requires further study. Thus, the purpose of this study was to understand the current status of ANC service utilization in the study area by elucidating the various factors influencing the use of these services.

Methods and Materials

Study setting, Study design

The study was conducted in Ambo town. Ambo town is the main city of west Showa Zone , central Ethiopia and has administratively three kebeles which are divided in to sub classes locally known as zone. The town is located 114 kilometers away from Addis Ababa (capital city) to the west. According to information from Ambo town municipality the total population of the town is 84,009 at the end of 2012 out of which 40,980 are females. The town has 13421 households. In the town there were one public hospital and two public health centers providing maternal health services.

A cross-sectional community based household survey was carried to assess antenatal care utilization and factors determining utilization of antenatal care services. The study was conducted between February and March 2014, in Ambo town.

Study population, sample size and sampling procedure:

Women aged 15-49 years who gave birth in the last two years prior to the survey were used as study population. Sample size was computed using single population proportion formula based on the following assumptions: the proportion of ANC utilization (p) to be 0.5, a margin of error of 5%, a confidence interval of 95% (Za/2=1.96), and 10% non-response rate. Accordingly, a sample size of 422 was determined.

Household census and numbering was done in the three sub-cities available in the town to fix a sampling frame. After identifying households with the target groups (women who gave birth in the last two years), proportion to sample size allocations were carried out based on the total number of the selected households. Ultimately, systematic random sampling was employed toidentify respondents from the selected households as astudy unit with the sampling interval of 19 from the total households of the selected sub cities. One eligible participant is expected from each household. In a situation when the household has twoor more eligible subjects only one was selected by lottery method to control the potential intrahouseholdcorrelation.

Outcome variable

Antenatal care utilization is dependent variable for this study. Women had received antenatal care check-up at least once during their pregnancy from formal sources.

Explanatory variables

Variables that have been theoretically, empirically and conceptually linked with antenatal care utilization such as age, religion, ethnicity educational status, occupational status, number of children, monthly income and access to media were taken as independent variables.

Data collection

Data were collected by ten female data collectors who had a minimum of diploma level education. They had three days of training for the purposes of data collection. The data collection process was closely supervised by field supervisors and the principal investigator.

A structured questionnaire was prepared in English, based on an existing tool and translated into the local language (Afan Oromo) prior to the start of the fieldwork. To ensure that the questions were clear and could be understood by both the enumerators and the respondents, the questionnaire was pretested and further refined based on the results. The questionnairecollected information on socio-demographic and obstetric characteristics as well as use of ANC for the recent pregnancy.

Data Analysis

Frequencies and variation were obtained for each variable and displayed mainly on the tables. Cross tab was used to see the association between the explanatory and outcome variables. Antenatal care was defined as receiving antenatal care check-up at least once during their pregnancy from skilled health care providers. Odds ratio with 95% confidence interval and logistic regression was employed to describe the strength of association between the selected study variables by controlling for the effect of possible confounders. The results were expressed as crude and adjusted odds ratio relative to the reference category at statistical significance of 95% confidence intervals and P-value of < 0.05. The assumptions of logistic regression were checked to be satisfied.

Ethical considerations

The research was approved for scientific and ethical integrity by institutional review board in the College of Medicine and Health Sciences of Ambo University. Verbal consents from all respondents and when necessary from their husbands were taken strictly before data collection and confidentiality was also maintained.

Results

Socio-demographic characteristics:

A total of 410 study subjects attended the interview making a response rate of 97.2 %.Table 1 described the characteristics of the study participants. Three hundred thirty eight (82.4 %) of the respondents were in the age range 20 – 34. The mean age of the respondents is 27.2 years (± 5.3 SD).Eighty three percent of the respondents were Oromo by ethnicity, nearly half (49.3 %) of respondents were orthodox and 45.9% were protestant by religion.

Sixty (14.6 %) of the respondents had no formal education. Regarding occupational status of respondents, only 161 (39.3 %) of them were employed, 18.3 %of the respondents were merchants and more than one third of the respondents (38.8 %) were housewives. Majority of the women 238 (58.0%) had monthly income of less than 1,000 Ethiopian birr.

Table 1: Socio-demographic and economic characteristics of the study participants, Ambo town, central Ethiopia, March, 2014 (N=410)

Variables		Frequency	Percent
Age	15-19	25	6.1
	20-34	338	82.4
	35-49	47	11.5
Educational status	No Education	60	14.6
	Primary education	160	39.0
	Secondary and above	190	46.3
Religion	Orthodox	202	49.3
	Protestant	188	45.9
	Muslim	16	3.9
	Other	4	1.0
Ethnicity	Oromo	341	83.2
	Amhara	60	14.6
	Tigre	5	1.2
	Others	4	1.0
Marital status	Married	345	84.1
	Divorced	30	7.3
	Widowed	23	5.6
	Never married	12	2.9
Occupational status	employed	161	39.3
	Self-Business	75	18.3
	House wife	159	38.8
	Others	15	3.7
Husband Education	Yes	297	86.7
	No	46	13.3
family income per month	Less than 400	97	23.6
	400 to 1000	141	34.4
	Greater than 1000	172	42.0
Access to media per week	No exposure at all	70	17.1
	Access to radio or TV	193	47.1
	Access to radio and TV	147	35.8

Obstetric characteristics of respondents

As indicated in table 2, nearly two-third of the respondents (59.0 %) had 2-4 children and only 17.8% of respondents had more than five. Of the total women interviewed, nearly half (53.2 %) had total family size of 4-5.Among the participants, majority (84.6 %) delivered their first baby between 20 to 34 years of age. In 23.4 % of respondents the recent pregnancy (last pregnancy) was unintended.

Table 2: Distribution of respondents by their reproductive characteristics, Ambo town, central Ethiopia, March 2014, (N=410)

Variables		Number	Percent
Live birth in life time	One	137	33.4
	two to four	242	59.0
	More than five	31	7.6
Family size	One to three	119	29.0
	Four to five	218	53.2
	More than five	73	17.8
Mother's age at first birth	15 to 19	63	15.4
	20 and above	347	84.6
Status of last pregnancy	Planned	96	23.4
	Not planned	314	76.6

Antenatal care utilization

The majority of respondents (84.9 %) had attended antenatal care at least once for their recent births.More than three fourth (76.7 %) of respondents had their first visit in the second trimester where as only 64 (18.4 %) attended their first ANC visit in the first trimester .The median gestational age at the first ANC visit was two months. Among who attended ANC, 298 (85.6%) respondents attended their antenatal care at public health facilities. Regarding the frequency of visits, 42.8 % of thewomen had attended ANC less than four times; and themedian frequency of visits was three.Concerning accessibility of ANC services nearly all 312 (89.7%) respondents reported accessibility as they were able reach the service within less than 30 minutes.For most ANC attendants the main means of transport was on foot (77.0%) whereas the remaining 23.0% was by vehicle(public transport).Overall, the delivery plan and importance of delivering at health institution was discussed with most 321 (92.2 %) of the women at ANC.

Table3: percentage Distribution of respondents by their ANC utilization, Ambo town, central Ethiopia, March 2014, (N=410)

Variables		Number	Percent
ANC attendance for recent pregnancy (N=410)	Yes	348	84.9
	No	62	15.1
Means of transport for ANC (N=348)	Walk	268	77.0
	Public transport	80	23.0
Time taken to access ANC service (N=348)	Less than 30 minutes	312	89.7
	More than 30 minutes	36	10.3
Gestational age at first ANC visit (N=348)	One to three months	64	18.4
	Three to six months	267	76.7
	Six to nine months	17	4.9
Number of visit for ANC (N=348)	Less than four	149	42.8
	Four and more	199	57.2
Advice given on ANC visit where to deliver N=348)	Yes	321	92.2
	No	27	7.8

Main reasons for attending ANC

Most of the women had attended ANC for reasons essentially linked with checking their current health (34.2 %), good quality of ANC care provided at the health institutions(23.3 %),assessment of fetal health status (23.0 %),being sick(9.7 %),encouragement from husband (5.2 %), and nearness of health facility (4.6 %) .

Main reason for non-attendance of ANC

As shown in Table -4, among those who did not receive antenatal care, 22.6 percent reported that they did not know it was important, 21.0 percent reported they did not attend as they had no health problems, 19.4 percent reported work load,11.3 percent said feel ashamed, and11.3 reported husband refusal.

Table 4: Distribution of respondents main reasons for ANC non-attendance Ambo town, central Ethiopia, March 2014, (N=62)

Reasons	Number	Percent
Do not know importance	14	22.6
No health problem	13	21.0
Work load	12	19.4
Husband refusal	7	11.3
Feel ashamed	7	11.3
Far health facility	5	8.1
Health workers poor handling	2	3.2
Afraid fee	2	3.2

Respondents' perception about the quality of the ANC

Respondents who attended ANC for last pregnancy were asked about their feelings concerning service providers and the majority, 261 (75%) reported that health workers were respectful. They also reported that they were satisfied with the services they were provided.

Factors affecting ANC utilization

On bivariate analyses, table 5, the utilization of antenatal care has been associated with a number of factors. Educational status, occupational status, marital status, access to media, monthly income of was positively associated with ANC use. Similarly , last pregnancy status, satisfaction with service, decision on large house hold purchases and husband's educational status were found to be significantly associated with antenatal care utilization (P<0.05) .

In order to assessthe contribution of these factors to overall variance, while controlling for confounding variables, multiple logistic regression analysis was conducted. In the final multivariate model, educational status, marital status, access to media and income were found to be significant factors affecting the utilization of antenatal care. Education was an important determinate on use of ANC. Mothers with primary education (AOR=3.38, 95% CI= 1.86-6.14) were three times more likely to receive ANC than those who were illiterate. Similarly, marital status had an influence on the utilization of antenatal care service. Married mothers (OR=3.43, 95% CI=1.23-8.34) werethree times more likely to receive ANC than those who were single. Divorced mother (OR=3.64, 95% CI= 2.535,5.43) were two times more likely to receive ANC than those who were single.

Monthly income of the households had also shown significant association with ANC utilization.Women of lower income were less likely to utilize antenatal care services as compared to the high income group (OR= 0.035, 95% CI 0.005, 0.251). Additionally, access to media was significantly associated with ANC utilization.Antenatal care utilization was increased with increase in frequency of access to media as women with no exposure to media at all had less ANC utilization when compared with women with daily exposure to media /TV(AOR 0.282CI .043, 0.894).

Table 5: Women's characteristics and its association with attending antenatal care for their recent birth Ambo town, central Ethiopia, March 2014(N=410)

Variables		**ANC utilization**		**COR(CI)**	**AOR(CI)**
		Yes	No		
		N (%)	N (%)		
Educational status	No education	44	16	.112(.055,0. 313)	.249(.048, 0.899)
	Primary education	141	19	2.45 (1.95 ,4.031)	3.38(1.86-6.142)
	Secondary and above	163	27	1.0	
Marital status	Married	314	31	2.601(1.446, 6.484)	3.43(1.23-8.34)
	Divorced	16	14	2.031(1.871-4.542)	3.642(2.531,5.434)
	Widowed	10	13	.545(.005,0.877)	.748(.066, 0.934)
	Never married	8	4	1.0	
Husband education	Yes	274	25	1.0	
	No	40	6	.318(.145,.697)	
Family income per month	Less than 400	57	40	.021(.006,.074)	.035(.005, .251)
	400 to 1000	133	8	.133(.040,.467)	.170 (.028, 0.94)
	Greater than 1000	158	14	1.0	
Access to media per week	No exposure at all	36	34	.082(.028,.240)	.282(.0453, 0.894)
	Access to radio or TV	179	14	.427(.137,1.333)	.261(.043, .647)
	Access to radio and TV	133	14	1.0	
Recent pregnancy status	Not planned	74	23	.422(.234,.764)	
	planned	274	39	1.0	
satisfaction with maternal health care	Not satisfied	84	47	1.0	
	Satisfied	264	15	1.502(1.567, 2.063)	
Decision on large household	Respondent	56	7	1.731(1.064,5.164)	
	Husband	74	17	.29(.161,.540)	
	Jointly	218	38	1.0	

Discussions

The main purpose of this study was to identify determinants that influence the use of ANC.According to the WHO recommendation; every pregnant woman should receive at least four ANC visits during pregnancy [6]. In this study 84.9 % of the mothers had at least one visit. The finding from this study is consistent with findings from studies conducted in Holeta town, of Ethiopia and Kenya in which 87.1% and 86 % of the respondents had at least one ANC visitrespectively[18, 19].Our study indicated better ANC care utilization in comparison with results from 2011 EthiopianDHS (34 %), Madhya Pradesh state of India,(61.7%), Munisaworeda, south east Ethiopia (34.7 %), Tigray region (54%) and Metekel zone, northwest Ethiopia, (49.8%)[17, 20,21,22, 23]. This better utilization of ANC services could be the result of commitment from the Ethiopian government and nongovernmental organizations working on the improvement of maternal care utilization and the fact that the study participants were selected from the urban residents for the current study. However, the findings is much lower than the findings from Vietnam and Democratic Republic of Congo in which 99.8% and 92.6% of respondents had at least one ANC respectively[24, 25].This difference could come from variations in health service coverage and socio-cultural factors that influence maternal health care.

Regarding number of ANC visits, our study revealed that only 57.2 % of the respondents attended ANC four and more times. This is similar with studies in the Democratic Republic of Congo in which 53 %attended four times. Concerning the gestational age to start ANC, in our study only 18.4 % of respondents initiated ANC in the first trimester which is almost similar with the findings from study conducted in Kenya in which only 11% started ANC in the first trimester [19, 25].The studyindicated thatmaternal education, marital status, house hold monthly income and access to media were significant predictors of ANC utilization. It is revealed that a wide variation in use of ANC between educated and illiterate mothers. Mothers who attended secondary levels of education were more likely to use ANC than those who were illiterate. This finding is consistent with findings from studies conducted in Holeta, Ethiopia and Turkey [13, 23].There are reasons why education influences ANC use. Educated women are expected to have knowledge and awareness about the advantages of the interventions and pregnancy related complications. They are more likely to seek modern health care than those who had no formal education. Education is likely to improve the general status of women and help them to build up confidence to make decisions about their own health.

In this study, marital status was found to be significantly associated with ANC utilization. The study indicated that married women were nearly four times more likely to use ANC when compared with unmarried ones. Similarly, significant association was seen between antenatal care use and house hold monthly income. Women with low monthly income were less likely to utilize ANC. Monthly income of 500 Ethiopian Birr and above increased the likelihood of ANC utilization. This is consistent with findings of other studies [13, 20, 23]. This could be because of the fact that better income increases the ability to pay for health care, transportation and other costs.Access to mass media (newspapers and TV) had a significant and positive effect on the use of ANC services as women who had access to media were more likely to use ANC. This result is similar with the study conducted in EDHS 2011[17], which showed increased ANC utilization among women with better access to media. This could be because of increased access to ANC information which might in turn increased awareness and knowledge of respondents.

The cross-sectional nature of the present study could cause difficulty in determining the direction of the association between the study variables and the associations observed could only be discussed in terms of plausibility which could be the limitations of the study.

As far as the strengths of this study are concerned, firstly, the respondents were selected by random sampling technique with relatively large sample size. Secondly, standardized data collection tools were adopted by reviewing different literatures. In addition, experienced interviewers and supervisors were used to collect the data.

Conclusion

In conclusion, though, this study indicated high coverage of at least one time ANC service utilization, there is low utilization of ANC services in the study areawhen compared to the recommendation by WHO that every pregnancy should get at least four visits. Lack of appropriate knowledge about the benefits of ANC and absence of health problems during pregnancy were the main reasons mentioned for not using ANC service. Educational status, marital status, monthly income and access to media were identified as factors associated with ANC service utilization in the study area.

Hence, information, education and communication on ANC must be intensified inorder to reach those who lack the knowledge on ANC. In a long run, women empowerment through education and income generating activities as well as involvement of husbands during information education and communication are recommended.

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Authors' contributions
Allauthors were responsible for the design and conduct of the study.The statistical analysis, theinterpretation of findings and drafting of the manuscript were done by the authors. The authors read and approved the final content of the manuscript.

Competing interests
The authors declare that there are no competing interests.

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